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Course: Math 101 -Summer 2016-Sec.
953 (Choden)

Assignment: HW 13: Mod Arithmetic and
ID numbers

1. Find the quotient and remainder in the division of n by m for:

$$n = 84 \text{ and } m = 13.$$

The quotient is _____

The remainder is _____

2. Find the quotient and remainder in the division of n by m for:

$$n = 43 \text{ and } m = 48.$$

The quotient is _____

The remainder is _____

3. Find the quotient and remainder in the division of n by m for:

$$n = 201 \text{ and } m = 14.$$

The quotient is _____

The remainder is _____

4. Is $p \equiv q \pmod{m}$ for $p = 56$, $q = 12$, and $m = 11$?

☐ A. No, it is not.

☐ B. Yes, it is.

5. Is $p \equiv q \pmod{m}$ for $p = 85$, $q = 31$, and $m = 10$?

☐ A. No, it is not.

☐ B. Yes, it is.

6. Is $p \equiv q \pmod{m}$ for $p = 14$, $q = 54$, and $m = 8$?

☐ A. No, it is not.

☐ B. Yes, it is.

7. Perform the indicated calculation in Z_m . Write your answer in the form of $[r]$ with $0 \leq r < m$ for:

$$[10] + [14] \text{ in } Z_{15}$$

The answer is _____.

8. Perform the indicated calculation in Z_m . Write your answer in the form of $[r]$ with $0 \leq r < m$ for:

$$[7] + [12] \text{ in } Z_{10}$$

The answer is _____.

9. Perform the indicated calculation in Z_m . Write your answer in the form of $[r]$ with $0 \leq r < m$ for:

$$[22] + [12] \text{ in } Z_8$$

The answer is _____.

10. The first nine digits of an ISBN is 2 – 534 – 81144. What is the correct check digit?

The correct check digit is _____.

11. The first nine digits of an ISBN is 0 – 454 – 59003. What is the correct check digit?

The correct check digit is _____.

12. The Universal Product Code (UPC) is a 12-digit number found on products that enables them to be identified by electronic scanning devices. The first six digits identify the country of origin and the manufacturer, the next five digits indicate the product, and the last digit is a check digit.

If the first eleven digits of a UPC are a_1, a_2, \dots, a_{11} , then the check digit a_{12} is chosen so that $0 \leq a_{12} < 10$ and $3a_1 + a_2 + 3a_3 + a_4 + \dots + a_{12} \equiv 0 \pmod{10}$.

Find the correct digit for the product code that has 0 20520 31546 as its first 11 digits.

The correct check digit is _____.

13. Federal Express packages carry a 10-digit identification number n . Its last digit x is a check digit that equals the remainder in the division of $(n - x)/10$ by 7. Find the last digit of the package tracking number with 906284625 as its first nine digits.

The check digit is _____.

14. Perform the indicated calculation in Z_m . Write your answer in the form of $[r]$ with $0 \leq r < m$ for:

$$[10] + [6] \text{ in } Z_{12}$$

The answer is _____.